

WHAT IS CLAIMED IS:

1. An optical function module for bi-directional wavelength-division multiplexer (WDM) optical communication system, comprising:

at least one wavelength managing module having a plurality of ports, the  
5 wavelength managing module optically coupling between a first optical transceiver and  
a second optical transceiver, wherein the first and the second optical transceivers  
provide a first and a second optical channels respectively for transmitting a plurality of  
optical signals with different wavelengths; and

at least one uni-directional optical function module having a high isolation  
10 function, and coupling to the ports of the wavelength managing module.

2. The optical function module of claim 1, wherein the uni-directional optical  
function module having a high isolation function is an optical amplifier module, and  
couples to the ports of the wavelength managing module.

3. The optical function module of claim 1, wherein the uni-directional optical  
15 function module having a high isolation function is a chromatic dispersion compensator  
coupling to the ports of the wavelength managing module.

4. The optical function module of claim 3, wherein the chromatic dispersion  
compensator further comprises an optical circulator and an optical fiber grating.

5. The optical function module of claim 4, wherein the optical circulator of the  
20 optical dispersion compensator is a three-port circulator.

6. The optical function module of claim 4, wherein the optical circulator of the  
optical dispersion compensator is a six-port circulator.

7. The optical function module of claim 1, wherein the wavelength managing  
module is a multi-window wavelength-division multiplexer (MWDM).

8. An optical function module for bi-directional wavelength-division multiplexer (WDM) optical communication system, comprising:

at least one wavelength managing module having a plurality of ports, the wavelength managing module optically coupling between a first optical transceiver and  
5 a second optical transceiver, wherein the first and the second optical transceivers provides a first and a second optical channels respectively for transmitting a plurality of optical signals with different wavelengths;

at least one uni-directional optical function module coupling to the ports of the wavelength managing module; and

10 at least one optical isolator optically coupled between the wavelength managing module and the uni-directional optical function module.

9. The optical function module for bi-directional wavelength-division multiplexer (WDM) optical communication system of claim 8, wherein the uni-directional optical function module comprises at least one optical add/drop module  
15 coupling to the ports of the wavelength managing module.

10. The optical function module for bi-directional wavelength-division multiplexer (WDM) optical communication system of claim 8, wherein the uni-directional optical function module comprises at least one uni-directional optical crossconnect coupling to the ports of the wavelength managing module.

20 11. The optical function module for bi-directional wavelength-division multiplexer (WDM) optical communication system of claim 8, wherein the wavelength managing module comprises a multi-window wave-division multiplexer (MWDW).

12. A bi-directional wavelength multiplexer optical communication system, for automatically switching optical signals, comprising:

a plurality of wavelength managing modules, each of the wavelength managing modules having a plurality of ports, and one of the ports connecting to a first optical transceiver and another port connecting to a second optical transceiver, the first and the second optical transceivers respectively providing a first and a second optical channels  
5 for transmitting a plurality of optical signals with different wavelengths;

at least one uni-directional wavelength crossconnect optically connecting between the ports of the wavelength managing modules; and

a plurality of optical isolators, each of the optical isolators optically connecting between the uni-directional optical crossconnect and each of the wavelength managing  
10 modules.

13. The bi-directional wavelength multiplexer optical communication system of claim 12, wherein each of the wavelength managing modules comprises at least one multi-window wave-division multiplexer (MWDW).

14. The bi-directional wavelength multiplexer optical communication system of  
15 claim 12, wherein the number of the wavelength managing modules is consistent with the number of input optical transmission paths of the bi-directional wavelength multiplexer optical communication system.

15. The bi-directional wavelength multiplexer optical communication system of  
20 claim 12, wherein the number of the optical isolators is consistent with the number of input optical transmission paths of the bi-directional wavelength multiplexer optical communication system.